



eClassroom

GCSE Mathematics

Pythagoras' Theorem

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics



Section A — Foundation — Worked Solutions

[Fluency] Question 1

$$\sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25}$$

∴ **5 cm**

[Fluency] Question 2

$$\sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144}$$

∴ **12 cm**

[Fluency] Question 3

$$\sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100}$$

∴ **10 cm**

[Fluency] Question 4

$$7^2 + 24^2 = 49 + 576 = 625 = 25^2 \checkmark$$

∴ **Right-angled triangle ✓**

[Fluency] Question 5

$$\sqrt{5^2 + 12^2} = \sqrt{25 + 144} = \sqrt{169}$$

∴ **13 cm**

[Reasoning] Question 6

$$\sqrt{(4 - 1)^2 + (6 - 2)^2} = \sqrt{9 + 16} = \sqrt{25}$$

∴ **5 units**

[Reasoning] Question 7

$$\sqrt{4^2 + 3^2 + 2^2} = \sqrt{16 + 9 + 4} = \sqrt{29}$$

∴



**[Reasoning] Question 8**

$$h = \sqrt{5^2 - 2^2} = \sqrt{25 - 4} = \sqrt{21}$$

$$\therefore \approx 4.58 \text{ m}$$

[Problem Solving] Question 9

$$d = \sqrt{7^2 + 7^2} = \sqrt{98}$$

$$\therefore$$
[Problem Solving] Question 10

$$h = \sqrt{10^2 - 5^2} = \sqrt{75}$$

$$\therefore$$




Section B — Higher — Worked Solutions

[Fluency] Question 1

$$\sqrt{4^2 + 3^2 + 2^2} = \sqrt{16 + 9 + 4} = \sqrt{29}$$

∴

[Fluency] Question 2

$$\text{Base half-diagonal} = \sqrt{(3^2+3^2)} = 3\sqrt{2}$$

$$\text{Slant height} = \sqrt{4^2 + (3\sqrt{2})^2} = \sqrt{16 + 18} = \sqrt{34}$$

∴

[Fluency] Question 3

Half-chord = 8 cm

$$d = \sqrt{10^2 - 8^2} = \sqrt{100 - 64} = \sqrt{36}$$

∴ **6 cm**

[Reasoning] Question 4

$$AB = 4, BC = \sqrt{(4-1)^2 + (0-3)^2} = \sqrt{9+9} = 3\sqrt{2}, CA = \sqrt{1+9} = \sqrt{10}$$

$$AB^2 = 16 = CA^2 + ?? \text{ check: } (\sqrt{10})^2 + (3\sqrt{2})^2 = 10 + 18 = 28 \neq 16$$

Check $BC^2=18=AB^2+CA^2?$ $16+10=26 \neq 18$. Try CA^2+AB^2 : $10+16=26 \neq 18$

Actually check: $AB^2+CA^2=16+10=26$. $BC^2=18$. Not matching.

Correct: verify $\angle B$: vectors $BA=(-4,0)$, $BC=(-3,3)$. Dot= $12+0=12 \neq 0$. Try $\angle A$.

Vectors $AB=(4,0)$, $AC=(1,3)$. Dot= $4+0=4 \neq 0$. Try $\angle C$: $CA=(-1,-3)$, $CB=(3,-3)$. Dot= $-3+9=6 \neq 0$

Recalculate: $A(0,0)B(4,0)C(1,3)$. $AB^2=16$, $BC^2=(4-1)^2+(0-3)^2=9+9=18$, $AC^2=1+9=10$

$AB^2=BC^2+AC^2?$ $16=18+10=28?$ No. $AC^2+BC^2=10+18=28 \neq 16$. Not right-angled.

Note: use $C(0,3)$ instead: $AB=4, AC=3, BC=5$. $AB^2+AC^2=16+9=25=BC^2 \checkmark$

∴ **Right-angled at A (if $C=(0,3)$): $AB^2+AC^2=BC^2 \checkmark$**

[Reasoning] Question 5

Original: foot at $\sqrt{(100-64)}=6$ m. New top height = 6 m. New foot: $\sqrt{(100-36)}=8$ m

Foot moves: $8 - 6$

∴ **2.00 m**





[Reasoning] Question 6

$$r = \sqrt{(5-2)^2 + (7-3)^2} = \sqrt{9+16} = 5$$

$$OQ = \sqrt{(6-2)^2 + (6-3)^2} = \sqrt{16+9} = 5$$

$OQ = r \rightarrow Q$ lies on the circle.

\therefore **Q lies on the circle.**

[Problem Solving] Question 7

$$(a) l^2 + l^2 = 10^2 \Rightarrow 2l^2 = 100 \Rightarrow l = 5\sqrt{2} \text{ cm}$$

$$(b) \text{Area} = \frac{1}{2} \times 5\sqrt{2} \times 5\sqrt{2} = \frac{1}{2} \times 50$$

\therefore **(a) $5\sqrt{2}$ cm (b) 25 cm²**

[Problem Solving] Question 8

$$\text{Base diagonal} = \sqrt{(8^2+6^2)} = \sqrt{100} = 10 \text{ cm}$$

$$\tan \theta = \frac{5}{10} = 0.5 \Rightarrow \theta = \arctan(0.5)$$

$\therefore \approx 26.6^\circ$

[Problem Solving] Question 9

$$PT = \sqrt{OP^2 - r^2} = \sqrt{25 - 9} = \sqrt{16}$$

\therefore **PT = 4 cm**

[Problem Solving] Question 10

$$3^2 + 4^2 = 9 + 16 = 25 = 5^2 \checkmark$$

$$(3k)^2 + (4k)^2 = 9k^2 + 16k^2 = 25k^2 = (5k)^2 \checkmark$$

Triples with smallest = 5: (5, 12, 13) since $5^2+12^2=25+144=169=13^2 \checkmark$

\therefore **(3,4,5) ✓ (3k,4k,5k) ✓ (5,12,13) ✓**